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THE

TRICYCLE

IN RELATION TO

HEALTH & RECREATION

BY

B. W. RICHARDSON, M.D., F.R.S.

[*Reprinted from "Good Words."*]

LONDON: WM. ISBISTER, LIMITED.

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PREFACE.

THE Papers collected in this little volume were written, originally, for *Good Words*, by Dr. B. W. Richardson. They created, at the time, an interest which still continues, and which has induced me to re-issue them in the present form.

They are reprinted, by Dr. Richardson's permission, with a few revisions and additions from his pen.

THE PUBLISHER.

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CHAPTER I.

INTRODUCTORY.

I AM indebted to my good friend Mr. J. Browning, who is always alive to useful public work, for first calling my attention to tricycling as a healthful recreation, and for giving me, at the same time, a practical interest in the subject by inviting me to join the London Tricycle Club as its President.

I then knew little of the tricycle, I had never ridden one, and least of all expected that I should ever learn to ride one, as I have since done, in the London thoroughfares.

For over five years now I have been a rider both in London and the country. I have ridden for exercise, for pleasure, for learning, and have found the practice good on all sides. The experience gained has led me, when riding, to feel as if I were a part of the machine and as if it obeyed my will without any greater effort of my

own than that which is put forth to move the limbs in walking. This seems to be a final test that a person has become a fair and natural, if not a rapid and dexterous, master of the machine. It tells that use has become second nature.

In having to use the machine I have tried also to acquire other and useful information. I have, as a matter of course, met and conversed with a great number of cyclists. I have heard much that they have had to say respecting the advantages and the disadvantages of the exercise. I have also gained a considerable amount of information in particular reference to the question of the effect of the exercise on the health of those who practise it.

What I have had my mind most fixed upon has been to ascertain:—

I. Whether the tricycle can be safely used by all classes of the community, or whether it is only fitted for a select few.

II. Whether the working of the tricycle is healthful as an exercise.

III. Whether there are any special dangers from its employment which, apart from mere accidents from falls and collisions, stand against its general introduction.

IV. Whether there are any practical rules which can be offered for the guidance of those

of different sex and different age who are anxious to become riders.

In offering a few short answers to these points of enquiry I shall dwell almost entirely on the use of the tricycle, but shall not omit occasional mention of the bicycle, when such reference seems called for by way of comparison or exposition.

CHAPTER II.

EXCEPTIONAL USES OF THE TRICYCLE.

IN relation to the question of the general use of the tricycle, and whether it can be safely used by all classes of the community, I should say, in so far as I am able to form an opinion, that the tricycle *is* adapted for general use. Presuming always that the proper machine for the proper person be selected, there is no reason why any one who is of fair health may not make use of it. It is good for either sex, and I may almost say that for girls or young women it affords one of the most harmless of useful recreations and amusements. It is very good for boys and men, and for men of all ages who can enjoy active physical exercise. To some it is exceptionally useful.

It would seem, at first sight, that men who are fat and unwieldy are not quite the persons to mount the tricycle, but if such men are in fair

health they are, after a little careful and judicious training, benefited by it more than many others. It constantly happens that men of this build, while they feel the need for exercise more than the slighter built sort, are unable to take a proper amount of exercise, because of the great weariness which they experience soon after they have walked even a short distance. They become what they call "leg tired." The weight of the body tells upon the lower limbs with so much effect, they cannot for long put one foot before the other without an exceeding sense of pain and fatigue. They have to bear all their weight on two limbs, which are not, as a rule, particularly strong or well developed, and the weight of body that has to be sustained is soon out of all proportion to the power of sustaining it.

The natural result of this rapid sense of fatigue is that exercise is given up almost altogether in a great number of cases, while in other cases it is a mere pretence; so that, practically, a habit is developed which promotes an objection to exercise, and a steady increase of all the dangers which follow upon prolonged muscular inactivity. We say of persons in this condition that they have become lethargic, and dull, and nervous, or, as some one has tersely expressed, "fat and fatuous."

In this state they who are affected are apt to follow one of two courses, both of which are bad. They either settle completely down to repose, and attain a form of chronic feebleness which requires to be provided against by avoiding every kind of lively effort; or, taking sudden alarm at some sensation they have experienced, or some observation they have listened to, they rush into forms of violent exercise, such as climbing mountains, or volunteering, or making forced walks, or such-like efforts. When the first of these methods—that of avoiding effort—is carried out, nothing whatever is done to insure relief; but by care in diet and absence of physical strain, life may be moderately conserved for several years. When the second of these methods—that of resorting to extreme measures of exercise—is followed, life is rarely conserved, and not unfrequently is brought abruptly to a close.

I believe I have seen more mischief induced, in the class of persons whom I am now describing, by their attempts to get into condition through the means of excessive exercise and physical strain, than in any other class.

They who court this mode of recovery from their helplessness are of all least fitted to bear sudden strain. In them the muscles are feeble and out of condition; in them the muscles, including

that most important of all the muscles, the heart, are overloaded with fat; in them the blood-vessels are often weakened, and have lost their natural resilience, if they have not undergone actual change of structure; and in them the breathing organs are in such bad form for extra work that breathlessness is produced by very little extra exertion. They are, in short, unfit for walking, and they are equally unfit for those extremer measures which are commonly designated as training, or as athletic exercises.

Of the two evils, comparative physical indolence and sudden excessive exercise, the first is by far the least. The person who luxuriates in repose sometimes learns a number of little practices which help to carry him along, not to what might be the natural close of a long life, but a fair way onwards in that direction. He finds out that by reducing the quantity of food to a moderate minimum; that by avoiding alcoholic drinks; that by rising rather early in the morning; that by indulging in a Turkish bath when he feels dull and drowsy; that by taking an active purgative when he is what he calls "bilious"; that by going away from time to time for a few days' change of air; and that by frequently taking rational and agreeable turns in the way of amusement he can pull along with extremely fair

health, and carry out as happy an existence as his circumstances will allow. Moreover, persons of the type named soon learn to take special care of themselves which more active people ignore or forget. They avoid draughts of cold air and a wet jacket; they are leisurely inclined when they have to climb ascents or are called upon to make an unusual physical effort, and, taking life thus easily, they rub along.

At the same time, it would be very greatly to the benefit of this class of persons, invalids, I may correctly say, if some sort of exercise were obtainable that would, without undue call upon them, secure for them the benefit of regular out-door exercise; exercise that should give the muscles due, and not undue, work; make the languid circulation go a little faster, the nutrition more active, and the excretion from the lungs and skin freer: exercise that should supply more air for the æration of the blood and fresh currents of air for what Benjamin Franklin called the daily air bath.

To this class of persons, if they are not subject to actual disease, organic affection of the heart, the lungs, or the brain, the exercise that may be got from the tricycle is exceedingly useful. The exercise sought in this manner should not be violent; it should not include attempts to work against time; it should not include attempts to

climb steep hills or to run down steep hills at a rattling pace; but it should be taken for some time on level ground, it should be carried on to a point just short of fatigue, and it should be increased little by little each day, until the labour of working accommodates itself to easy habit. After a few weeks of exercise the first difficulties disappear. The sense, almost painful in the beginning, of fatigue in the muscles of the fore part of the thighs is lost, and it is learned that, as in the exercise, the weight of the body is taken off the extremities, and, as the muscles of respiration are not oppressed, a distance of five or six miles can be traversed with less weariness than one mile of walking on foot would be sure to produce.

I have mentioned in the class of people above named those who, of all others, may be considered at first sight as least likely to be fit subjects for the work of the tricycle. There are others, however, to whom I ought to refer, and I notice specially those who, from sedentary modes of life or from increasing years, feel an unpleasant stiffness of limb and joint, and a dislike to undertake anything like active movements, owing to their certain knowledge, obtained from experience, that the thing cannot be done. Paterfamilias is often joked by his young friends that he cannot perform

their feats, cannot stand on his head, or give a back, or, as the late John Leech forcibly and famously put it, leap over a walking-stick. For these stiff-jointed inactives the tricycle comes in with great force, if they use it with judgment and do not trespass too much on re-acquired skill.

During an autumn tour I accompanied a fellow-rider who, though many years older than myself, could beat me in getting along, and who told me that before he began he was so rigid in muscle and joint he could scarcely get into the machine. A few weeks' practice had set him at liberty from head to foot with such effect that in walking and riding—for he invariably walked up steep hills, pushing the machine before him—he could average his five to six miles an hour for five or six hours per day, and think nothing of the task.

We may, then, consider that stiffness of limbs is not to be accepted as an obstacle to tricycle riding, but as a condition that may be relieved by the exercise, when the practice of it is carried out with prudence and common sense.

It is impossible to say at what age the art of cycling should cease, provided always that the capacity for it is retained. We have had an instance recently in which a well-known tricyclist, who has long passed his seventieth year, has ridden against young men and youths with a

competitive skill of the most remarkable character, and who has ridden more miles in one day than the number of the years of his own life. That this gentleman, who seems benefited rather than injured by his skill, is exceptionally constituted may be assumed, but the assumption has yet to be proved, by comparison from a wider experience.

CHAPTER III.

EXCEPTIONAL USES—(*Continued*).

THERE is another class of persons to whom the tricycle does not at first sight appear commendable, but to whom, with moderate judgment in using it, it is sometimes beneficial. These are people who are rendered inactive, not by indolence either of body or mind, but by some occupation, or devotion to one particular pursuit, which keeps them from bringing their physical energies into service. They live probably in the centres of large communities and they feel that it is absolutely impossible for them to think of getting out of town for fresh air. They become thereupon depressed and disheartened, and at last fall into so nervous a state that everything apart from their actual daily avocation is an anxiety if not a fear. The countryman speaks of the persons here referred to in rather contemptuous terms. He says they are "regular cockneys," and he laughs at their nervous fears with good natured irony.

To the people thus indicated the exercise from the tricycle, when it is once acquired, as an easy exercise, is excellent. It not only enables them to leave the close air of the town and to revel in the open country, but it gives to their nervous system a most refreshing exhilaration and firmness. It trains their senses to new skill and endurance; it teaches them to think less of passing events which, once, to them were dangers, and it liberates them from fears which are the worst fruits of morbid imaginations.

One, who is now really an excellent and even bold rider, told me that before he took to the tricycle he could not go to sleep at night because of the fear he experienced at the idea of some imaginary accident which might befall him during his early progress with the machine. After he had been a short time on the road this anxiety would disperse as if by magic, but at night it would return again for a considerable period, until, in fact, he had acquired a new education for his senses and thereby a new tone of mind, which, by confidence, expelled fear.

Persons who are suffering from the milder forms of hypochondriasis are often so suffering on account of deficient exercise more than from any other cause. These, when they get over the nervousness which they seem usually to feel in

encountering any change of life or manner, are nearly always benefited by tricycle riding. I do not know of any class of persons, in my range of experience, who have benefited more. The exertion is good for them, but the change of scene and custom is even better. The excursion "takes them out of themselves"; it leads them to mix with others; it tends greatly to remove the reserve by which they are tormented; and it excites just sufficient emulation to make them feel that they have a will of their own, and are not such poor and helpless persons as they once conceived themselves to be.

These people are usually confirmed dyspeptics so long as they keep to their unnatural secluded mode of life. Everything seems to disagree with them, and they measure out their food and drink as if life depended on the quantity rather than the quality of sustenance; but when they get their appetites sharpened up by the pleasant and brisk exercise out of doors this fastidious habit soon passes away, and they fall into a more natural taste and craving for food than they have experienced before—a sensation which is to them an immense relief and pleasure.

There is another class of persons who are of an inherited gouty constitution. They are born of gouty parents or they have some members

of their family who are subject to the disease. They themselves, though they may never have had an attack of acute gout, are often suffering from what they call suppressed symptoms, attended with considerable depression of mind, testiness of temper, and general irritability. These again are members of a class who are immensely improved by the exercise on the tricycle, whenever they give that exercise a fair trial without indulging in excess. This last-named point is of extreme importance in their case; for with them sudden and violent exertion is often sufficient to bring on the very evil they desire to avoid. If they have passed youthful manhood or womanhood—if their power of exciting and throwing off those products of their own bodies which require to be excreted, then, by quickening the production of the products under violent exercise and waste of muscle they cause a waste which they cannot at once dispose of, and so render themselves feverish and gouty. But if they so apportion their exercise as to quicken nutritive action and replenish new tissue, just in proportion as they are able to eliminate effete material, then they, in fact, as well as in word, *re*-create, and become, as they sometimes say, like persons endowed with a new vitality.

The tricyclist of the gouty constitution should keep this little bit of information always in mind.

It will help to explain many contradictions which he is sure to hear respecting the effects of tricycling on men of his nature, and it will keep him in mind of the kind of practice which he ought to follow. It will teach him so to apportion out his journeys as to avoid profuse perspiration at the beginning of his exercise, and it will guide him into prevention against what to him will prove a certain failure and break-down—the attempt, after a long rest and close sedentary life, to rush into the country on his machine at full speed and over a long distance without the preliminary and necessary training.

CHAPTER IV.

ON TRICYCLING FOR THE HEALTHY.

ON the second question to which I have devoted attention—whether the recreation or work of tricycling is healthful for the healthy—I can report favourably in every way. When a tricyclist is free from any of those conditions which tell against the exercise he would undertake, he can find few more cheerful or healthy recreative pleasures. I use the word pleasures, and I mean it, for when the roads are good there is a real pleasure in skimming along them on a bright day, which has to be experienced before it can be fully understood. I do not feel that I should be quite correct if, stating my own experiences of the two modes of exercise, I said that tricycling is equal to riding on horseback. That would from me scarcely be true, for surely there is no pleasure of exercise equal to a trot or canter or gallop on a good horse or cob. But after this, to those who

cannot ride a bicycle, the tricycle is next best. It is curious to find, when the legs have become trained to the work of the treadles, how unconsciously the movements of propulsion are made, and how soon the guiding of the machine by the hand chimes in with the work of the legs and feet. If, moreover, the motion be carried out moderately, if the rider content himself to make five or six miles an hour his steady pace, it is equally a pleasant surprise to feel how easy the travelling is, and how fast the ground seems to be traversed. I am told by riders who do their sixty to eighty miles a day that the latter portion of the ride seems very tedious, unless there be pleasant companionship, and that is easily understood. It is not necessary to contemplate such tediousness in this place, since we are thinking only of comparatively short trips, in good weather, on fair roads, in pleasant country, and in search of health.

When these advantages combine there is nothing but pleasurable sensation in riding on a good tricycle that suits its rider. Time passes quickly, and the eye collects all that is interesting without dwelling on objects too long, as in walking, and without losing sight of them too rapidly, as in rapid driving in a railway carriage. The power of assimilating the scenery in this agreeable way

is always healthy; it keeps the brain active, without wearying it on the one hand, or confusing it on the other; and when the mind goes well all goes well.

That is always a good exercise which fills the mind easily with pleasant objects; and I may add that is always a good exercise which gives the mind a little excitement in taking care of the body without letting the excitement or care pass into the range of worry or fear. Under these two provisions the ordinary cares or worries or troubles of life are, for the moment, forgotten or laid by, and are, in consequence, rested from, because there is neither time nor opportunity for them to occur.

In the mode of exercise we have under consideration, there is here an important point gained on behalf of busy men who are seeking rest from business cares. If these men go down to the sea-coast or to some inland place merely to lounge and to ramble about, and sit down and smoke and try to read, they soon find they cannot help going back to the work from which they think they have escaped. They go back mentally. They recall what they have been doing or what they are about to do; they regret something which, for the first time, occurs to them, and fume under the recollection. Or they discover something that ought to be done, and fume again because

they are not at home to do it. Thus it often happens that the journey they took for the purposes of rest is a journey of fatigue; it is like a sleep made wearied and valueless by dreams.

An exercise, during the occasion of a holiday, an exercise which diverts the mind, and by necessity shuts it off from dismal broodings and labours and speculations, is therefore a good, healthy exercise, and one always to be commended. Tricycling answers this purpose.

There is also about tricycling a new pleasure—the pleasure, I mean, which one always feels of doing something better and quicker than ever it was done before for one's self, and by one's own efforts. It is pleasure to feel that one can get over so much more ground, in so much shorter a time, than was ever done by walking. It is a new pleasure to feel that one can, by natural strength, skill, and a few weeks' training, independently of any extraneous aid, clear five-and-twenty or thirty miles a day without undue fatigue. It makes a man of middle age, or past middle age, feel young again, which to a certain extent is to be young again.

I hope I shall not be considered as carrying the idea of the value of tricycling exercise too far in these observations. I am speaking from direct experience, and expressing what I have felt

myself, and what I have heard from others, as to the mental diversion and rest which come from the exercise when it is reasonably and judiciously enjoyed.

I have named several classes of the members of the community who would always be specially benefited by the exercise of tricycling if they could follow it in a reasonable and common sense fashion. As to the general community that is in health nothing more need be said of it than that it possesses in the tricycle one of the happiest means of keeping in health that can be obtained through physical training.

CHAPTER V.

SOME GENERAL OBJECTIONS TO THE EXERCISE OF CYCLING.

IN the introductory chapter I put the question whether there are any special dangers from tricycling which, apart from mere accidents from falls and collisions, stand against its general introduction.

I wish to answer this question with all the candour and all the care it demands, and in doing so I will briefly mention those persons who should not ride at all, and those who, if they ride, should do so with more than ordinary circumspection, and with strict care not to induce over-fatigue.

There are some persons whom I would not recommend to try the tricycle at all. I would specially recommend persons who are excessively nervous and of uncertain mind not to try it. In such people the anxiety attendant on the exercise is injurious out of proportion to the service that

is gained by it. They are ever on the strain to avoid accident and danger, and ever on the look out for accident and danger. From these causes they fail to obtain a good command over the machine. They are not certain what to do when other vehicles meet or pass them; they are not sure how to take a turning; they are in doubt as to the mode of going down hill and of resting in going up hill; altogether they are perturbed by the attempts they make beyond the value of the attempt. If, therefore, persons of this nature do not, after a few weeks of fair trial, get over these anxieties, and forget them, as if they had never occurred, they had better not continue to court them.

I would strongly recommend all who have a sense of giddiness or of sinking and sickness, when they have ridden a little way on the tricycle, to give up the exercise, unless, after a short training, they find these sensations pass away. If, while climbing a hill, there is felt a sensation of fulness and throbbing in the head, with a want of power in propelling and of precision in managing or steering the machine, I would tender the same recommendation.

I would, as a general rule, recommend all those who are distinctly and knowingly affected with

organic disease of the heart not to ride. I am quite aware of the fact that a great many persons who are suffering from heart disease do ride. One of my own and much esteemed medical friends, who was suffering from valvular disease of the heart, would continue to ride his bicycle nearly up to the time of his death, and, according to his own belief, was not injured by the exercise. Indeed, he maintained that his pulse gave a better reading or record after he had been riding than before. I am quite aware also that there may be some forms of disease of the heart in which the physician may see some advantage from the exercise. Lastly, I am not unmindful of the statement that amongst the many thousands of riders there has been, I believe, no recorded instance in which a person has fallen from the machine owing to heart affection.

For all this the recommendation holds good, not to ride. There is always a risk of a sudden catastrophe when the heart is given to fail in its mechanical work. We are frequently obliged to hear of persons with heart disease dying suddenly while making for a train, or while undergoing some other kind of hurry, and we cannot, therefore, expect less than occasional misadventure on the tricycle or bicycle in the same members of the community. There would, moreover, in their case, be the added

risk of severe concussion from the fall if they lost power, short of losing life, from temporary arrest of function in the central organ of life, the propelling and governing heart.

I should recommend all who are subject to epilepsy to avoid the use of the tricycle and bicycle. This is a point of great importance, because it is a fact that some epileptics, and especially some who only have the seizures at long intervals and who begin to think, from that cause, that they are quite safe, do accept the risk. In truth, they are never quite safe. I do not know of a single instance of the kind in which it could be said, with certainty, that safety or immunity from attack had been rendered absolute.

It should also be known that in persons afflicted with epilepsy a very slight external cause or vibration acting upon the surface of the body is apt to bring on an attack. In the act of riding, the danger of being exposed to such vibration is more than usually great, and the risk intensified.

The above are instances of persons who ought not to ride under any circumstances.

We now come to the second class of persons, those who may ride, but who should always do so

with moderation and with studied care not to overdo what, in strict moderation, might be one of the best things they could do.

The precautions should extend to the advanced in life, the hard-worked middle-aged, the sedentary, and the young.

These may ride, but they are not exempt from risk of a serious kind if they are careless to simple and common sense rules.

The following are fair specimens of the dangers these have in view:—

A gentleman seventy-eight years of age has started a tricycle. He finds, to his intense surprise, that he can ride from Brighton to Lewes without fatigue. That is about eleven miles. In a few days he discovers he can go there and back in one day without fatigue. A few days later he tries to do the same distance against time. He can do it in four hours. But there is a young fellow he knows—who, by the way, is only sixty years younger—who can do it in a little over two hours. Why should he not come near to that mark also? It is a mere matter of practice and skill. So he does his best, and having no elastic tissue left in him fitted to give his lungs and blood-vessels due elasticity, he finds himself jarring all over like one of the old bone-shaking bicycles, cannot get over the "jolting"

for a month, and dates a good deal of mischief from the jolting, as if the machine, and not the human machine, were the thing at fault.

Here let me, in parenthesis, put in a word before I forget it. Whenever a middle-aged rider, mounted on a good machine, and riding on a good or fair road, begins to feel jolting, it is the rider that is jolting. He has ridden enough for that time. If he continue to oppose this admonition he will be shaky and uncertain in movement and resolution for many after hours or days.

Another gentleman, not quite so old as the last-named, makes up his mind against distance. It is his firm determination to ride from London to Bath, one hundred miles, in a day. It is merely a matter of starting in good time in the morning, and taking the journey by easy stages. He does thirty-three miles as a trial right off, and feels "as fresh as a daisy." After a little rest he is surprised to find he has a curious sinking at his stomach, and can take no food. He says he was stopped in his effort by a bad fit of indigestion, which spoiled his riding for a fortnight, and rather set him against it altogether, because he could not go from London to Bath in a day "like other people."

This suggests another note of much practical importance. Whenever a rider feels a sense of

stomach-exhaustion from riding, is unable to take food with appetite after the ride, or digests slowly after the ride, he is told as plain as these words can tell him that his nervous tone at the centre of life, the stomach, is exhausted, and that he had better do no more until he has rested completely and re-studied Æsop's fable of "The Belly and the Members."

A middle-aged gentleman, who is engaged in sedentary occupation, and who is subject to occasional attacks of rheumatic gout, is advised, very properly, to take to the tricycle. He takes to it, and learning to do eight to ten miles per day, is quite astonished at the result. He feels like a new man. His spirits are so light, he walks so well, he sleeps so well. He could not have believed that such a change for the better could have been effected. He waits for a holiday that he may get over a good deal more ground. Previous to the holiday, and indeed preparatory to it, he keeps close to office work, and then, getting clear, he starts off for a tour. The first day he gets over his thirty to forty miles, perspiring very freely. The next day he tries to repeat the experiment, and then, strangely enough, as he thinks, he is visited with a smart touch of his old enemy, the rheumatic gout, and is obliged to give up.

A third note of much practical meaning is

suggested by the above-named experience. Whenever a man of sedentary habits, who is greatly benefited by the tricycle exercise, taken in moderate and regular efforts, finds that he is getting premonitions of rheumatic affection—pains in his wrists and in other joints, feverishness, acidity, and restless desire for rest while cycling—he has an intimation of having done too much. He has produced a degree of waste of his own muscular fibre beyond that which he can freely eliminate, and has made himself rheumatic by his experiment.

The above admonitions in respect to those of or beyond middle-age, drawn, as they have been, from direct observation of natural occurrences, extend, in another direction, to the younger members of the cycling fraternity who pursue it as a competitive sport.

Cycling, as an exercise and a sport, has not been in fashion long enough to enable us to see what may be the effects of it on the young who practise it excessively, and under special circumstances of strain and fatigue. What has been made out so far is, beyond expectation, strongly in its favour. No other mode of progression at the same rate and for the same distance has ever been accomplished with the like freedom from

actual exhaustion. To make a hundred miles a day on ordinary roads on a bicycle is now considered commonplace amongst practised riders, some of whom indeed smile at two hundred as nothing very particular. One hundred miles in the twenty-four hours on the tricycle is one day looked upon as remarkable; but in time Mr. Marriott does one hundred and eighty-three miles, and he has since beaten his own record by a ride of two hundred and nineteen. Even ladies have cast in their skill for these sharp and long tricycle rides, and one of them, Mrs. Allen, has accomplished one hundred and fifty-three miles within twenty-four hours.

These results of a single day's work, remarkable enough as proofs of physical skill and energy, are overmatched by what has been effected in short runs against time.

In short runs against time on the track, over twenty miles an hour has been made on the bicycle, over sixteen miles on the tricycle. In short runs against time on a level road, eighteen miles an hour has been made on the bicycle, fifteen on the tricycle. I have recently been a witness of the fact of twenty-five miles being accomplished on the bicycle on a hilly road, at the rate of fourteen miles an hour, by a rider who has not yet reached his twenty-first year.

The above two results admit of being compared with efforts of endurance made through long journeys, over the track or prepared firm level surface, and over common roads extending from one part of the country to the other, and of the most varied kinds of surface. In some of these efforts on tricycles, distances of seventy miles a day have been kept up for thirteen days, and John o' Groat's to Land's End has been traversed at this rate. On the bicycle the same journey has been accomplished at the rate of over a hundred miles per day.

It took the famous anatomist John Hunter fourteen days to ride from Edinburgh to London on a fairly good horse. A modern bicyclist in good training would do the same journey in four days. It was considered a wonderful feat that Mrs. Siddons should one night play in London and the next night appear, thanks to the post-chaise, on the stage of the theatre at Bath. In these days a trained lady tricyclist might perform the same feat by her own muscular efforts.

It is only fair to give due and proper praise to labours which have made these changes possible. I am quite aware, from having watched the course of improvements throughout, that the success has been attained by the courage, and what I may call industry, of those who have ridden the

machine for sport. I am quite aware that these enthusiasts have been obliged to carry out their work under extreme disadvantages. I well remember reading a calculation from a man of science who was thought to be by no means a contemptible reasoner, that it was positively impossible for any person to propel himself on the best road at a greater pace and for a longer period than was attained by the simple act of walking. I also remember what a machine it was that the early bicyclist, and, still more, the tricyclist, had to begin upon in the early days of the art. I have seen how all these difficulties have been, one by one, met, and how the riders of machines, by their contests against time, distance, and endurance, have made the mechanical geniuses keep up with them. I thank those who have effected so much in the way of progress as sincerely as any one of their most ardent admirers.

There is, however, a danger of enthusiasm directed in one direction alone, and this enthusiasm is, I am sure, carrying the young cycling fraternity too fast and too furious in what they call their sport. It is true that in cycling there is an immense saving of vital organs, as compared with the strain which is put on those organs by other exercises, such as walking, running, climbing, and rowing. In cycling the whole weight of the

trunk of the body is taken off the lower limbs, while the concussion produced by the descent of the foot on the ground is saved—a great saving. In cycling there is no strain on the muscles of respiration in any ordinary effort. In cycling, therefore, the lower limbs do the greater part of the work, and that without strain of tendon or friction on the sole of the foot or weariness felt at the ankle and knee.

Were there not these savings there could be no accomplishment of a tithe of what is commonly performed even by commonplace riders. At the same time, it is not all safe. Putting altogether aside the dangers which are apt to occur from falls and other physical accidents, there is, in extreme competitive strife, a strain which is, I am quite sure, most injurious to the organism, and which will, I confidently predict, tell seriously on the lives of several cyclists who are now carrying their exertions to an extreme length in respect to strength, pace, and length of effort. In one man I can see the clear evidence of premature age induced solely by over-taxation and persistent training. In another I observe the excessive muscular growth of the muscles of the leg, like that which has been observed in the opera-dancer—a sign which, local though it may be, is a bad sign as indicating an unequal development of the body, and what we

doctors term hypertrophy of muscle; a sign which will, in the end, lead to loss of balance of power in the affected parts. In a third I notice a pallor and vibration which indicates a disturbance that ought not to exist between the vascular and nervous systems. In a fourth I detect a restlessness and feverish anxiety which bodes no future good. And in many I am beginning to recognise a too nervous interest in everything that pertains to the sport, to mean either success to the maker of it or to the sport itself.

CHAPTER VI.

SOME SPECIAL OBJECTIONS TO CYCLING AS AN EXERCISE.

SINCE the tricycle and bicycle have been in extensive use, certain objections, all of which demand attentive consideration of a special character, have been urged against their use. I will refer to the more important of these, selecting such as are most inquired about by actual or intending riders, whether of the tricycle or the bicycle.

There are some persons who, being riders or desirous of commencing to be riders, suffer from an enlargement of the veins of the legs—varicose veins. They put the question frequently, whether they ought or ought not to ride. When this question was first brought under my notice I was chary about admitting that the exercise was permissible. One or two, however, who suffered

from very large veins put the matter of decision out of my control by deciding for themselves. The first rider who thus broke through the rule I had ventured to lay down had no reason to repent or to accuse himself of rashness, for, in fact, the enlargement of the veins after he began to ride almost entirely passed away. The next who followed the same course was certainly not in the least injured by the exercise. The veins remained very little altered, while the general health considerably improved.

Since these two experiences I have been led to modify my original view, but there are, notwithstanding, two sides to the subject, that is to say, there are some persons who can safely ride, and there are others who cannot.

The difference depends on a very clear and common sense reason. In certain persons the enlargement of the veins is purely local. It is not dependent on any organic obstruction to the returning currents of blood through the veins to the right side of the heart. These persons are often of sedentary habit, and, having little activity of circulation, are suffering from slow return of blood, under which the veins become distended, and assume the character of enlarged, or, as it is technically said, varicose veins. These are benefited by the exercise. They encourage by the

exercise a brisker blood current, they get a better and freer circulation through the liver, and they breathe more freely; the veins empty themselves with greater ease, are rendered less subject to pressure from within, and, by virtue of their contractile power, now relieved of oppression, regain their natural size to a considerable degree, and in the young to a degree which may mean an actual cure.

In other persons the conditions are not so favourable. The enlargement of the veins is not merely local, nor simply dependent on inactivity. The enlargement is due to obstruction of blood in one or other of the great vital organs, the liver, the heart, the lungs. When this obstruction is the cause, the effect of the exercise may increase the evil, and I advise every one to be careful not to ride either tricycle or bicycle who is suffering from varicose veins from obstruction.

The cause of the varicose veins can easily be ascertained by any competent medical man, and I recommend the cyclist to make sure of his condition by going to his medical adviser and asking him to determine if the course of the blood is or is not unimpeded by central obstruction, and whether there is any objection to the exercise.

Under the most favourable view it is well for the rider who has enlarged veins to have them well

supported, either by a nicely adjusted bandage or by an elastic stocking made of material as light and porous as can be obtained. Such a rider should also be a little more careful than other riders in having all obstacles to the easy getting in and out of the machine cleared away, so that they may run as little risk as possible of mechanical injury.

The same anxiety that is felt in respect to varicose veins is often expressed in respect to hæmorrhoids, the presence of which sometimes causes pain during riding, or prevents the exercise altogether. The rule here is for those who suffer from hæmorrhoids not to ride if pain is produced during the time when the exercise is being carried out; or if pain regularly comes on after the exercise has been discontinued.

People who are subject to hernia or rupture are often anxious to know if they may venture to ride either the tricycle or bicycle. It is only possible to answer this question in the most general form, because everything in the way of a correct answer turns on the character of the hernia; whether it be large or small; recent or of old standing; easily reducible or not easily reducible; easily sustained by a truss or support or not easily sustained. In this difficulty I should once more suggest that the

only safe course for the enquirer to take is for him to consult his medical adviser, who will instruct him definitely on the propriety or non-propriety of riding; on the best mode of support; or, it may be, on the best kind of machine to use.

Speaking generally but guardedly, I may state—that great numbers of persons who are afflicted with hernia ride both tricycle and bicycle without experiencing any unusual inconvenience; that I have not heard of any dangerous consequence from the practice; that the tricycle seems to be the machine most to be preferred under the circumstances named; and, that the rider should never proceed to ride until provided with a good, easy, and well-fitted support.

When, many years ago, the old heavy velocipede began to be used, it gained great disrepute as a cause of hernia. A relative of one of our leading surgeons became ruptured in consequence, as it was believed, of the strain of riding a steep hill on a velocipede. Facts such as these hindered for a time the introduction of the velocipede. In the present day the objection seems entirely to have died out, and properly so. I have not heard of any case in which the first efforts to ride either tricycle or bicycle, or the act of riding in any stage of the exercise, has induced hernia. There may have been some such accidents, but they are

obviously too rare to be taken into serious account against the employment of the machine.

A few months since Dr. Strahan, of Berrywood, drew the notice of the public, through the pages of the *Lancet*, to a danger from cycling, which he correctly called the danger of perinæal pressure.

It cannot be denied that Dr. Strahan, in this instance, called attention to a real danger, which was, perhaps, afterwards a little overstated, but which required to be discovered and commented on. The danger consists of a prolonged pressure on the perinæum by the weight of the body upon the saddle, and it shows itself by several unpleasant symptoms, the worst being a sense of numbness extending from the part itself down the inner surface of the thighs, and sometimes extending even to the feet. Connected with this there may be mechanical injury to the urethra. I do not dwell longer on this topic because it refers to a risk which, as we shall see in a future page, admits of remedy as soon as it is known, and which is easily avoidable by improvement in the construction of the saddle or seat, so as to avoid the injurious pressure.

SUMMARY.

If the rider, who is following up cycling for the sake of health, will avoid the two extremes,

the one of sudden strain, the other of prolonged fatigue, he will be benefited, in the most marked degree, by country riding on the tricycle, and I should suggest that in all private and public institutions for invalided persons this mode of exercise might, under skilled direction, be brought into service. It causes the chest to fill and empty freely without undue labour; it leads to a good oxygenation of blood; it produces a genial and equable circulation through the skin; it induces, when duly moderated, an agreeable sense of fatigue; it relieves depression of mind; it promotes a healthy desire for wholesome food; and it invites, naturally, good and refreshing sleep.

The evening time, in genial weather, is an excellent period for the exercise; after which an ablution, a light meal, and bed, are the three good genii by which to entice sound and refreshing slumber.

CHAPTER VII.

FIRST LESSONS IN TRICYCLING.

THERE is an idea by those who do not ride the tricycle that the work of it is exceedingly fatiguing, and those who are riding receive very often from the lookers on anything but complimentary observations, with proffers of assistance as singular as they are uninviting. In point of fact, however, nothing is easier than tricycling when the art of it is mastered. It is easier than walking, it is as easy as riding on horseback on the easiest horse that can be ridden.

The peculiarity of the process of riding on the tricycle—when once the art is obtained—is that so much can be done not only without fatigue, but with a sense of lightness and of relief from weariness, bodily and mental, which is positively refreshing. I can ride forty miles on the tricycle experiencing, I can safely say, less fatigue than from walking ten or from riding on horseback

twenty miles, although I am fairly practised in both the last-named exercises, while I am comparatively a novice on the tricycle.

The reason of this it is not difficult to explain.

In walking, the legs carry, directly, all the weight of the body, and as each foot comes down on the ground there is a certain vibration or shock quite through the body, which, though not acutely perceptible, is, nevertheless, fatiguing. The breathing, also, is carried on at a disadvantage, for, in walking, the diaphragm, or great respiratory muscle, is not able to act with that steadiness, and, as it may be said, purchase, as it is when the pelvis is fixed, the spinal column firm, and the upper limbs steady. The circulation, too, is considerably quickened, and the heart is toiling at a rapid speed, lifting very quickly the whole of its blood over the ascending aorta, the first part of the great blood-vessel which springs, in the form of a beautiful arch, from the heart, to conduct the blood to all parts of the body.

In riding on horseback the body is seated, but the sitting is not firm. The body rises in the saddle with the forward movement of the animal, and falls with the next movement, so that there is with the best riders a persistent concussion; there is, moreover, some weight borne from the stirrups. All these movements are adverse to saving of

labour, and are very fatiguing. The lower limbs become weary from the support they have to give to the body of the rider, and from the grip they have to maintain on the body of the horse. The upper limbs become fatigued from the exercise that is demanded in guiding the horse, while the movement incident to the motion of the body and of breathing is carried out at a great disadvantage, a disadvantage quite as great as that from walking. The effect on the circulation is still worse. With each concussion the column of blood rising from the heart is brought back upon the protecting aortic valves, and the tension of the great artery is tried severely. In the old days of posting, when men were regularly employed to ride post-haste, this effect of constant strain upon the great aorta gave rise to a disease, an aneurism or dilatation of the vessel to which the significant name of "post-boy's disease" or "post-boy's aneurism" was applied.

In tricycling these difficulties are very greatly lessened if not removed. The body is firmly seated, and the direct weight of the body upon the lower limbs is taken off, the limbs themselves being left free to do the work required. The concussion of the body through the limbs is also much relieved. The body is steadily placed and the breathing is well and easily and firmly sustained.

Best of all, the heart is not subjected to over-strain or concussion by the exercise when the exercise is carried out with steadiness and freedom from violence of effort.

These are the reasons why the motion expended on bodily work in tricycling is so much easier than that expended on walking or riding on horse-back, easier, in short, than by any other mode, except by the bicycling.

It must not, at the same time, be supposed that tricycling can be successfully practised off-hand, and that it is only to mount and be off. There really is a good deal to learn in order to tricycle—quickly, merrily, safely, healthily. The art must be learned, and a few of the most important points to be learned, in order to make the exercise good and healthful, may appropriately come in here.

Learning to use the Pedals.

Beginners often are led to make hard work of the exercise from not getting hold of the art of moving the pedals. I was myself a long time very clumsy, and made myself more weary in a mile than I would now in twenty miles. This art, which can only be acquired by practice, does not consist in throwing all the force of the rider into every movement, but in skill in making each movement sharp, clean, and complete in itself,

reserving always the full force that may be judiciously thrown in for special occasions when the necessity arises. The art is perfect when the rider, while progressing, has learned to forget that he has any legs at all, and when he works them automatically, changing the pressure without any serious thought as to the reason of change, and leaving the higher nervous centres free for steering and foreseeing all the obstacles that lie in the way.

To arrive at this very simple perfection a few details have to be attended to by the learner. The first of these is for him to make up his mind to the certainty that there is no practical difficulty in the way of attaining to the perfection required. The next is to gain confidence in the power to sit and propel with the feet. The third is to adjust the seat or saddle and the handles in such manner as to suit the precise requirements of the particular rider. The last is to hold all force that is not required for immediate service in reserve for great emergencies.

In propelling, then, the learner, if on a rotary machine—must be careful to plant his feet firmly on the pedals in such manner that the ball of the foot rests on them. Many commence by putting either the arch of the foot or the toes on the pedals, which is an entire mistake, because, as a fundamental rule, it must be remembered that

the best motion is got by treading, as in walking, and that the nearer the movement of walking is obtained the better. The pressure down being made from the ball of the foot, the heel should be brought into good play: the heel should descend as the foot goes down, by which movement the pedal is not only brought to its lowest, but without extra labour is pushed forward. This prevents partial dead stops or locks, makes the machine move on evenly and gives momentum. The motion started in this manner should be sustained steadily; it should never be in starts or spurts, and, except when the object in view is actual racing, it should not be at racing speed. Six miles an hour, taking one road with another, for six hours a day, is the steady motion to be attained to. A great deal more may of course be accomplished by practice, but the rider who can master this pace and keep it up, day by day, has nothing to be ashamed of, while he may be assured that if he be in fair condition he is pursuing a course which is as healthful as it is enjoyable.

If it be kept in mind that walking is the mode of propulsion to be imitated, the ankle motion will then be gained as a matter of course, and the knee motion will not be strained. It will be soon discovered that the knees must not be too much

bent, and that three parts standing is the best position on the seat or the saddle. If the seat is set low, and the knees are bent, the power that is lost is dead against good and effective work. In the bent position there is no weight put into the work, which is a loss, while there is an impediment introduced from another cause. When the knee is bent the great mass of muscle which runs down the fore-part of the thigh, and which, including the knee-pan, ends in a tendon or sinew attached to the large leg bone, the tibia, is working at each contraction with very great friction, its tendon being held tight upon the knee-pan. It therefore soon becomes exhausted, wearied, stiff, and painful. But if the limb be kept nearly straight while at work, the weight of the body comes into instant action, and the muscle, left easy in its work, undergoes no more fatigue than the other muscles of the thigh and leg.

The lessons to be drawn from this fact are these:—(1) Do not sit too heavily on the seat, but only so as to rest the body firmly. (2) Keep the seat so high that the feet reach the pedals, when at their lowest, comfortably and no more. (3) Have the seat sufficiently forward to enable you to be well over the pedals, or, as the usual saying is, "well over the work."

Too much attention cannot be paid to these details. Many riders fail for a long time, from no other cause than from neglect in attending to them.

The Seat.

The character of the seat is of moment. The seat should be so shaped that it does not in the least interfere with the backward movement of the limbs. For this reason I recommend gentlemen to ride on a rather long and narrow saddle. For ladies I recommend a small seat well hollowed out on the front edge so as to give as much freedom of movement as can possibly be obtained.

The observations of Dr. Strahan, already referred to, have led to some new and ingeniously devised saddles, in which the upper portion of the seat is hollowed out so as to take off the perinæal pressure. A seat has also been devised by Mr. Bale, of the Coventry Machinists' Company, having the same object in view. In this seat there are two movable rests or bases, which move, the one free of the other, with the upward and downward movements of the limbs, so that the body rests as in a chair, with two moving sections, instead of sitting across a rigid saddle.

It is a matter of moment for every one to keep to his own saddle or seat. It is good for every

rider to keep to his own machine, and to have it altered for others as little as possible; but it is essential for the saddle to be exclusively his own; it soon becomes modelled to the necessary form; but, like a shoe, it is a thing which no two persons can comfortably adapt and adopt.

CHAPTER VIII.

FIRST LESSONS—(*Continued*).

MANAGEMENT OF THE BREATHING.

IN learning to ride the tricycle the management of the breathing should have a first consideration. To get into a good and healthy habit of breathing, and to get that habit confirmed, is worth a great deal to riders of all ages. Let, then, the following brief rules be kept in mind.

There are two handles on the tricycle, one of which, that on the right hand, is used for steering the machine; the other, that on the left hand, for holding by. Both afford support. By seizing these handles firmly, and pulling up by them, great power may be got for propelling the machine, because by this means the hands and arms come in to assist the legs and an extra force is put on. Young riders are apt to begin by laying on this reserve power, and never giving it

up. To use this assistance, however, the chest has to be firmly fixed. The easy, natural movements of the chest, those movements by which we unconsciously fill the chest in the ordinary way when we are quietly moving about or sitting, are not carried out, but deep breathing is established, the lungs are filled with air to distension, and great pressure is thrown upon the heart. These are bad effects to keep up; they soon cause extreme fatigue, and they prevent the rider from being ready to meet difficulties in climbing, in going over rough roads, and in meeting other obstacles which are sure to spring up whenever he undertakes a few hours' journey. The point of practice, consequently, is to use the handles as rests for the hands on all common occasions, to lay hold of the handles lightly, with no more force than is just necessary for steadiness and mastery, and only to bring them into full use when the necessity arises—that is to say, when extra power is suddenly called for, as on approaching the upper part of a hill, or in moving over rough or soft ground.

Another rule about breathing is to learn from the first to breathe by the nostrils, not by the mouth. I do not know why it is, but certain it is that many riders get into the way of mouth-breathing, as if they had no nose at all, the

moment they get into the saddle. The result is always bad. The passage of air over the surface of the tongue and throat renders those surfaces very dry, so that in a short ride the desire for some liquid to moisten the mouth and throat becomes urgent, and leads to the injurious habit of swallowing a large quantity of drink, in order that the throat be not made dry and sore from the dryness. In addition, power is lost from three sets of causes: (*a*) the rapidity of the breathing that is induced; (*b*) the irritation and cough that are often brought on; and (*c*) the reduction of purchase in respiring, owing to the constantly open state of both the breathing inlets and outlets, the nostrils and the mouth.

It is important, therefore, to continue to breathe by the nostrils in the ordinary and natural way from the beginning of the practice of cycling; and if this be always remembered and determinately followed out, no difficulties will be experienced. But the bad habit once acquired is not easily thrown off.

There is another advantage to the tricyclist in learning to breathe by the nose, which to him, of all men, is useful. In the course of riding he comes into contact, under many circumstances, with perfect clouds of dust, from the streets and roads, and in country places from the fields. In

breathing by the mouth a large surface of moist mucous membrane of the mouth and throat is exposed to dust, some of which is, of necessity, swallowed, is sometimes an unsuspected source of dyspeptic derangement, and may lead, occasionally, to more serious attacks of disease.

CHAPTER IX.

RULES AS TO BODILY WORK.

THE earliest exercises on the tricycle should be taken on a level road, and they should not be so prolonged as to produce fatigue or embarrassment of the breathing or circulation. Gradually the time of riding should be increased and the common difficulties of the road met. It is good practice to commence by riding one or two miles the first day, and not to exceed four miles a day for the first three or four days: after that the exercise may extend to five miles a day, and in a week or two to the full of the rider's capacity.

On this point of the rider's capacity for work there are certain rules bearing on health which are vital.

RULES.

1. The riding should never be carried out at any one time to the extent of causing excessive

weariness, stiffness of the muscles and membranes, and want of power in the limbs.

2. In climbing a hill it is never advisable to strain every muscle, from the foolish determination to mount the hill at all costs. It is best, and quickest, and easiest, and safest to dismount and to push the machine up to the brow of the hill. The act of walking for a short distance relieves the rider. It brings a new set of muscles into play, and it "stretches" the body, to use a common expression.

3. Practice in climbing will enable a rider to get over difficulties which a young rider considers all but impossible. I found that out beyond anything I had expected when I began to ride, and I can now, without fatigue, climb hills which I would never have dared to have faced at first. This art is got by the process of treading the machine, that is, of throwing the whole weight of the body into the pedals, by which process a heavy rider, quite as easily as a light one, can acquire the power of getting up a hill. Yet it is bad to attempt to carry this effort too far, as all good riders will maintain. The question is when to get off the machine, whether before or during climbing!

Some reckon by the ascent, and tell you that when the eye roughly measures an ascent of one

in seven or eight, it is the wise thing to dismount and push up the machine. A better practice is to be guided by the power of the rider to move on without bringing in his reserve force. If the hill be long and he finds it necessary to pull hard at the handles in order to make progression, the time has come for him to dismount and to walk the ascent.

4. In descending a hill every advantage should be taken to save the motion of propulsion and to let gravitation do the work of the rider. It is in this way that so much labour is saved in riding, and so much advantage is gained over walking, not only in speed, but in actual work, for, as we all know, walking down hill is very shaking and laborious work. Sometimes, on the tricycle, however, too much advantage is taken of the running down hill, and a speed is got up which is not merely accompanied with a certain amount of unnecessary risk from falls, but with other risks which, less perceptible to the rider, are hardly less dangerous. These are excitement, fulness, thereby, of the brain with blood, and concussion from the rattle of the run, all of them injurious results. I have known extreme giddiness, and what we physicians call vertigo, produced by too rapid running down a long descent. *Facilis decensus* is a good motto to keep in mind on

these occasions, together with the moral that clings to it.

In running down hill it is wise to keep the machine well in hand by the brake, to confine the pace to seven or eight miles an hour, and not to attempt to get up momentum until the lower part of the descent is reached. There, after considerable practice, a little more freedom may be permitted so as to assist in meeting a rising ground, just as, for all time past, our drivers of carriage, coach, and cart have been accustomed to close a down-hill and breast an up.

5. The capacity for work when the art of good riding has been acquired should never be measured by what can be done on one day or on one particular occasion. The body is sometimes capable of performing without sense of fatigue a much larger amount of work than it is at other times. Very trifling circumstances also assist or oppose a rider. The direction and character of the wind, good or bad turning of his machine, or good or bad temper of his own, change the labour vastly. One ride cannot, therefore, as a matter of course, be taken to represent another, and, in touring, it is very bad to set up as a hard and fast rule that so much, *nolens volens*, shall be done in a day. The safest plan is to keep in the mind a fair but not too high average, and never to exceed that except

under favourable circumstances. The average I have already given—six miles an hour for six hours a day—is as sound a rule as I can suggest in the present state of tricycular evolution. What may come as the machine is improved, when it is made to wind itself up as it runs down hill, with the brake turned into a reserver of force, I will not venture to say.

6. The rule not to overstrain the body in riding by attempting too much is applicable to persons of all ages, but it requires to be enforced on the young, who are the most liable of all to suffer from overstrain. Growing youths are not fitted to make prolonged and wearisome journeys, extending over several days or weeks, at high speed, and taxing all the physical qualities of the rider. The idea of our young is speed! speed! speed! They wish to go, like the letters of a past time, labelled "haste! haste! oh, haste!" The end is folly. It is turning a good thing to a bad use; an enjoyment into a slavery; a healthy into a break-down exercise. I know that it would be vain to try to stop competitive riding. I know that by competition the makers of tricycles are enabled to test their machines, and are stimulated to carry out improvements. Yet there must be a limit or the art will be endangered from the injury it will inflict, and when it becomes a strain on the

vital powers then the injury it inflicts on the life is inevitable. I feel this so much that I once gave a prize for a fifty mile competition with a sense of compunction which is unpleasant to recall, although the most judicious arrangements to prevent any approach to consequences that might be regrettable were carried out.

7. In order to effect a long ride without severe fatigue it is good, and indeed right, to divide the journey into easy stages. From two to three hours is long enough to work at one stretch, and fifteen to twenty miles is long enough for one ride. It is always wise, in touring, to take the morning and evening for the longest rides, and few enjoyments equal a gentle spin along a pleasant road by moonlight.

I do not think it is either a sound or desirable plan to break suddenly through fixed physical habits bearing on bodily rest and bodily exercise, and I would not, therefore, recommend those who have arrived at mature life to alter their times for rest and work very much, out of regard to the practice of this new exercise. If they are, by habit, early risers, I should say by all means take full advantage of the first hours and in the prime of the morning for the first ride, get eighteen miles out of the thirty-six of a day's tour. Then six or eight miles may be made in the

course of the day, and the remaining ten or twelve when the sun is going down, or, if there be a full moon, when the moon has risen. By this division time is afforded as well for rest as for the purpose of becoming better acquainted with the history and character of the localities through which the journey is made.

CHAPTER X.

RULES AS TO FOOD AND DRINK.

Food.

THE question of eating and drinking during the practice of tricycling, and especially during a tour on the machine, is of great importance, and sound rules in respect to this subject, when they are not made too arbitrary, are certainly desirable. In the first place, it is always bad to commence on a very hearty meal, that is to say, before the digestion of the food has been fairly accomplished. To use a plain simile, the tide from digestion ought to turn towards the blood before the exercise begins, then all is on the right side. If the exercise is made to commence while the vital forces required for the digestive process ought still to concentrate on the stomach and the other digestive organs, the digestive process is not completed; a portion of food remains in the stomach undigested; there is some uneasiness, attended

with flatulency; and, the pleasure of the ride is confounded with depression of spirits, with failure of activity, and vigour in work. Some riders finding out this fact choose to take no regular meals at all during the journey, but prefer to carry with them some plain and simple food and drink, like a meat biscuit and a bottle of cold tea or milk, and to partake, without dismounting, of a little very frequently, as they go along.

I understand that this plan answers very well indeed when a long distance has to be made and when there is little or no time to rest after a meal. It is better, nevertheless, to dismount, take a light meal of mixed food, rest for a good long time to let digestion have full swing, and then to go on again, gently at first, briskly afterwards. Such a plan allows for digestion of the food, for quick and excellent distribution of it over the body for nutritive purposes, and for a healthy and sharp appetite for the meal that is next to come.

The diet itself can scarcely be too simple. Animal food should be fresh, not salted, and well cooked; light animal foods, like fish and fowl and mutton, are very good to work on; eggs and milk are very good. A couple of eggs beaten well up in a cup, with hot water, sweetened moderately with sugar, and treated with a small quantity of milk so as to make up from half-a-pint to three-

quarters of a pint, is, with a little biscuit, an excellent sustaining meal for those to whom eggs are easily digestible. To those who can digest it oatmeal porridge is very good to breakfast on; and to all who can digest milk, milk lightly thickened with wheat meal is most sustaining. Bread should be taken in moderate quantity, and fresh vegetables and fresh fruit are always in character when not taken in excess. Some fruits which for a moment seem extremely refreshing while on the journey become a cause of thirst if the day is very warm. I notice this particularly in regard to oranges, the most tempting, perhaps, and the most easily obtainable of all fruits.

Drink.

Of drinking during tricycle exercise I must speak with some care. It is not very difficult to learn to tricycle without a desire for too much drink of any kind. But if the beginner does not learn to breathe through the nose, if he acquire the habit of breathing through the mouth, he is sure to acquire also the desire to take liquids far too freely. He will feel he cannot get on unless he has something to quench thirst, an evil habit even though the drink be as innocent as the purest water itself.

With natural breathing very little drink is

wanted, and it is a point, therefore, to drink as little as possible; to drink as much as will fill up the loss that is made by evaporation of water from the body, and not any more.

What the character of the drink shall be is not very difficult to answer, and what it should not be is answered with less difficulty, for certainly of all things again it should not be an alcoholic stimulant. On this last-named point we who are advocates for total abstinence from all alcoholic beverages have secured, beyond any mistake, a fine score from tricycling experiences. Those who are to some degree in opposition to us on the general question, those I mean who still hold that alcoholic drinks are in their right place as luxuries and should not be denied as luxuries, are with us if they are practised tricyclists, in expressing that alcoholic stimulation is fatal to good, sure, and sustained work. A few years ago Mr. Marriott and a friend performed the extraordinary feat of cycling, the one on a bicycle, the other on a tricycle, from Derby to Holyhead, over one hundred and eighty miles, within twenty-four hours, and could have gone on twenty miles further, if they had not been "checked by the sea." They did this touching no drop of alcoholic drink by the way, "and it is certain," Mr. Marriott says, in his description of the

journey, "that we could not possibly have done it if we had dared to indulge in any alcoholic beverage." Their experience tallies completely with that of others, and with the experience of men who perform other physical feats of skill and endurance: such men as Hanlan, the oarsman; Weston, the pedestrian; and Carver, the marksman. It tallies with the experimental experiences of the late Dr. Parkes, and with the practical experience of many military men who have had occasion to march their soldiery in large bodies over long distances under and during great privations and difficulties. It tallies with the experiences of those who have watched the heavy labours of labouring men engaged in such works as brick-making, iron-forging, wood-cutting, and the like. But it becomes of unusual value when it is witnessed from the fraternity of cyclists, because so many of them are working for the pleasure of the exercise and the healthiness of it, and would be the last men to forego, voluntarily, anything that would facilitate the art, increase its delight, and add to its health-giving advantages.

When alcoholic drinks are taken by those who are engaged in cycling, the effects are most characteristic. If a very light drink, one which ies an almost inappreciable dose of alcohol, be taken, a little weak claret for instance, or

thin beer, or thin cider, the effect may be *nil*, or, at most, only embarrassing for a few minutes. If so much, however seemingly little, be taken, as shall produce what is felt to be an effect, then the mischief is done, and the bad results last for a longer or shorter time according to the dose of the alcoholic spirit which has been swallowed and carried over the body. The skin is more or less flushed with blood, there is a brief interval of hectic fever, there is a relaxation of vessels, a sense of fulness in the head, a feeling of irritability and quickness of circulation, a succeeding sudden deficiency of bodily power, and a depression, languor, and inability to sustain or maintain effort; the whole ending in chilliness, and in desire either for repetition of the deceptive friend—the stimulant—or for rest from labour.

The drink, which on the whole serves the cyclist most efficiently, is cold weak tea, made a little sweet with sugar, if that is liked, but never over-sweetened, for if it be over-sweetened it causes thirst. To some the tea is rendered more palatable by being treated with a little lemon-juice, made, in fact, into what is called tschai, or Russian tea, but I am not sure that the lemon does not increase thirst, and I know that in some persons it causes acidity and heartburn, so that, on the whole, tschai is not so refreshing as

tea simple. Another very nice and more sustaining drink may be made by pouring boiling milk and water upon tea, instead of boiling water—milk tea. This slightly sweetened can be carried in the bottle or flask during the journey, and, diluted with water or soda water at the wayside inn, is at once refreshing and sustaining.

Coffee is not so good, generally, as tea, and by the cycling fraternity is not, I think, very often called into requisition. It may be that it is not so easily prepared as tea, and does not, in consequence, find so much favour. It is good as a variety, and it may be carried in the form of fluid extract, in which form it may possibly come into greater use.

The various effervescing drinks sold under so many names and offered under such a number of inviting representations as tonics, exhilarators, nerve sustainers, and what not, are all objectionable to the health of the tricyclist. They create thirst, they create dyspepsia, and they have no real sustaining power. I do not recommend lemonade, unless it be unexceptionably good, nor Seltzer water, if it be possible to obtain pure well or spring water. It is unfortunate that, in passing through our prettiest villages and towns, it is more difficult to get perfectly pure and safe water than any other commodity of food or drink, and

one is often obliged to purchase the waters supplied by respectable firms for the sale of ærated drinks for no other reason than that there is nothing else that can be trusted. The water supplies of English towns and villages are a disgrace, in fact, to our civilisation, and I hope that bicyclists and tricyclists, by preaching a crusade against the unclean fluid which is so often brought as water, may call the attention of local authorities to a reform most urgently needed, the pure supply of the only natural drink for man and beast. Until that is done, our inn-keepers would do well to boil a large quantity of water every day, and pour it through a charcoal filter, from which it can be drawn for drink and sold per glass at a moderate price, say a penny the half-pint or pint.

Some riders select as a drink equal parts of milk and soda-water. Once in a day this may be taken to the extent of half-a-pint of soda-water to a quarter-pint of milk, if good milk can be obtained. But milk and soda-water is not an easily digestible beverage; it is apt to create derangement of the stomach, and it often causes thirst. It is nothing like so good as milk and tea, or milk and water lightly thickened with a little oatmeal, a combination which, to those who like oatmeal, is very sustaining.

On the whole, whenever and wherever it can be obtained, pure water is the best fluid on which to work in cycling as well as in every other pursuit; and if I were preparing for a long tour, the first addition I should make to my equipment would be a complete light and portable apparatus for boiling and filtering the precious fluid which Nature, on her grandest scale, distils for the drink of all her children.

CHAPTER XI.

ON DRESS IN RELATION TO CYCLING.

KNICKERBOCKERS, STOCKINGS, AND SHOES.

IN practising on the tricycle and in making journeys upon it attention should be paid to the dress. The dress should fit neatly to the body without being at any point cumbrous. Loose flaps of dress and tails of coats are very troublesome, and even dangerous. The jacket should fit nicely to the body, and the trousers, sufficiently free and loose, should not be pursy about the legs and feet. Trousers answer very well, but knickerbockers and well-fitting stockings are an improvement on them.

Experience in cycling, since the above was written, has led me to speak still more strongly in favour of the knickerbocker, when it is not too loosely constructed, and what is called the breeches knickerbocker is, I think, the best. In this the upper part of the garment is nicely fitting and easy,

but is not so loose as to form folds. The leg portion below the knee is made to button in a large flap as in the old fashioned knee breeches, but the whole is so loose that the knee has the freest possible play.

I have seen constructed what may be called trouser-knickerbockers which answer very well. In these the leg of the garment is of the same length as the trouser, but is rather loose and is so planned that the lower part below the knee can be drawn up and attached round the leg, just below the knee, by a strap or band. The advantage of this is that after a ride the puckered or looped up part can be let down and the trouser dress can be assumed.

The stocking should be nicely fitting and of porous material. A closely woven stocking is always a bad one for free exercise and is very bad for cycling. The texture of the stocking should be elastic and soft. The stocking should not be long; it should reach just to below the knee, where it is met and grasped by the band of the knickerbocker, if that be worn.

Many riders have questioned if garters should be used by cyclists, and some six or seven varieties of garters have been invented. Narrow and broad elastic garters have been suggested; garters made of elastic material but with

buttons interposed at a little distance so as to make pressure at several points instead of all round; garters of semi-elastic substance fastened by buckles or buttons, and so on. In a word, there are none that are very commendable, and I would advise that the stocking of the cyclist be so shaped that it will keep up by its own general grip or elasticity upon the limb altogether. If, however, a garter must be worn there is really nothing that beats the old flat list garter made by tearing a length off the coloured edge of a piece of new flannel, and fastening by one or two turns round the leg and a twist or two under and over.

For the feet shoes are better than boots, unless the boots fit uncommonly well and lace far down towards the toe. Spring-side boots are bad; they prevent the easy movement of the ankle, which is so very essential for free pedal-play. The shoes should have good firm soles, but they need not be unusually heavy. The soles should be free of nails and of steel plates, and it is worth the trouble to have them sufficiently roughened to grip the pedals firmly. Some cyclists have the soles of the shoes notched or divided partly across, by which means they get a good hold on the pedals, and I believe with pedals that are made of metal and have a toothed edge the plan answers

well. The deep notch is not wanted for the pedal that is covered with india rubber, but a rough sole is still necessary. In one instance I all but met with a serious accident owing to a smooth sole of a new shoe slipping from the pedal while I was going down a short incline rather quickly.

The Upper Dress.

In the upper portion of the dress there should be as perfect freedom as in the lower part. The neck should be left as free as possible; a loose, light silk handkerchief is far better than a collar and stiff tie. Every convenience should be given for easy and rapid motion of the head in looking round, and the circulation through the vessels of the neck should be quite unimpeded. The head-dress should be light and yet firmly fitting on the head. A straw hat, in my opinion, answers, on the whole, the best.

The rest of the dress of the tricyclist should on no account be heavy. Thick flannel underclothing is an entire mistake; it prevents free transpiration from the skin, and causes the garments to become wetted through from the perspiration which, during the process of tricycling, is always thrown off very freely. The substance of the clothing should be porous as well as light. The best colour is grey. It is well to carry an extra suit of clothing

in a waterproof case attached to the tricycle, and it is always imperative to change the dress after every journey if the garments are made damp, either from rain or from perspiration.

I do not strongly recommend waterproof coats for wear during tricycling. These coats keep out rain, truly, but then they keep in the water which is transpiring from the skin, an evil quite as serious as that which occurs from rain. It is all very well to have a loose ventilated waterproof cape to wear during a shower with the body at rest, but it is not wise to work hard under the waterproof covering; it is better to push on unencumbered by anything of the sort, and, having arrived at the place of shelter, to change the clothes and get into a dry suit.

Precautions after Riding.

On returning from a ride, even in fine weather, it is wise to make it a rule to change the dress, and at the same time to carry out a good ablution of the body. I know of no more delightful sensation than that which is experienced when, after a fine ride, the bath has been indulged in, and a light, dry change of clothing has been put on. The whole body seems to be renovated. The dull and languid secreting and excreting organs have been stimulated into activity, the mind is light

and clear, and the muscular organs are ready for work, relieved from fatigue, rather than tired and sleepy. The water used in the bath for the ablution should not at first be cold; it should be just agreeably warm, but it may often, with advantage, be reduced to a lower temperature for a final douche. The skin should be dried with brisk friction.

CHAPTER XII.

CHOICE OF A TRICYCLE—GENERAL RULES.

MOST intending cyclists wish to learn what is the best kind of machine to purchase. All practised cyclists know that, as every well-constructed machine has some particular excellence in its favour, there is nothing more difficult than to name any one machine or to commend any one machine as being above all others the best.

I certainly shall commend no special machine, bicycle or tricycle, and I shall let the bicycle alone altogether, even in regard to general principles of selection, and that for the simple and correct reason that I have had no practical experience with the bicycle.

On the tricycle I will offer a few general memoranda which may be useful to the readers whom I am now addressing, and whom I suppose to consist of would-be tricyclists who have no great

competitive struggles in view, who wish to enjoy the exercise for the sake of usefulness, pleasure, and health, and who are of adult age.

The tricycle for such persons should have the following essential qualities :—

1. It should be as light as is compatible with safety, strength, and durability.

2. It should be easy of access, so that getting into it and out of it may be accomplished without trouble, strain, or nervousness.

3. It should have, in all its parts that play over each other, as little friction as is possible.

4. It should be as free as possible from vibration when in motion.

5. The saddle or seat should be adjustable in the easiest manner; pleasantly elastic; and constructed so as to avoid perinæal pressure.

6. The handles of the machine should be adjustable, so that the rider may have the best purchase upon them.

7. The machine should be a double-driver; that is to say, the force expended on propulsion should be distributed to both the large wheels.

8. The steering should be of the truest form; the steering handle on the right hand, and the steering wheel in front.

9. The brake should be under the most perfect control of the rider. It should be sufficiently

powerful to stop the machine effectively on any incline, and it should be armed with a lever powerful enough to enable the rider to put on the pressure firmly in the promptest as well as the gentlest manner, so that it may act quickly and yet without jerk or pitch.

10. The machine should be armed with an alarum or gong, and should carry one or two good lamps, the light from which should be perfectly unobscured either by the rider or any part of the machine, in the front or the rear.

11. The machine should be furnished with a small bag or pouch containing a spanner, an oil can, a small screw driver, and any other tool necessary for altering or adjusting the mechanism.

12. The machine should also carry a light cage or support for a bag, basket, or "hold-all," for clothes, books, and other requirements of a tour. Lastly, the machine should have attached to one of its wheels a good cyclometer, which shall register a log of at least fifty miles.

CHAPTER XIII.

CHOICE OF A TRICYCLE—(*Continued*).

COMMENTS ON THE GENERAL RULES SUGGESTED ABOVE.

THE twelve rules described in the last chapter are easily remembered, and contain all that need be condensed for general service. It may be well, however, to specialise upon some of the rules, so as to supply a few useful details.

Respecting the weight of a tricycle. It may be accepted as unnecessary that the weight exceed seventy-five pounds. The machine I ride weighs a little over seventy-five pounds and it is strong enough. I have seen a machine very much lighter than seventy-five pounds and still strong, but, for good steady work, that I think may be taken as a fair average weight.

In order to secure what I have called ready access, the machine which is mounted from the

front should, in my opinion, be quite free in the front. There are advantages I know in a front steerer with the wheel in the centre. The bar over the wheel gives an excellent foot-rest for descent down inclines, and the machine runs very steadily. But when the front is quite clear, the perfect readiness with which the movement into and out of the seat can be made compensates for the loss of the front rest and for the little inconvenience of having the rest on one side instead of in the centre.

On the road, too, there is another great advantage in having the front or steering wheel at the side and not in the middle. It gives what is called a double track instead of a third or separate track for the steering wheel, and on every road the rider can pick his way along much more smoothly. He has only to find two lines for his three wheels, and on bad roads this finding is a great relief. In suggesting the two track machine I exclude the open fronted back steering tricycle which is now becoming obsolete, because it is not very safe to steer and does not allow the rider to see how he is steering.

The exclusion of this kind of machine, and of the centre front-steerer, brings us down, in front-steerers, to the two-track machines, of which there are two kinds. (*a*) The machine to which

there is a large driving wheel on the left side and two small steering wheels on the right. (*b*) The machine to which there are two large driving wheels and one small steering wheel placed in front of the right driving wheel.

Of these two kinds of open-fronted two-track tricycles I, personally, prefer the one with the two large wheels and side-steering wheel in front. But both are excellent when the construction is perfect in its details.

There are other machines in which there are two large driving wheels, with a back wheel over which the rider sits, while he steers by the two large wheels. These are tricycles of the Humber type, and, for persons who are practised in the use of them, they surpass all others, I believe, for speed. In these machines the process of mounting takes place from behind, and is very safe and easy.

In order to reduce friction in the machine to the smallest, every tricycle should be fitted throughout with what are called ball-bearings. There has been some discussion whether the interposition of the small steel ball-bearings prevents friction more effectively than roller-bearings. For my part I feel that practice answers the question in favour of the ball-bearings without any possibility of mistake.

To prevent vibration is always an important point. I am certain that in proportion as a machine saves the body from vibration so it saves involuntary labour to an extent that is not as yet duly accredited, simply because what is saved is labour which is not recognised at the time when it is being expended. The means of saving consist in causing the saddle to rest on the easiest and most even spring; in fitting the wheels with bold india-rubber tyres; and in coating the handles with thick india-rubber coverings. I do not think inch rubber at all too thick for the tyres, and I have found the plan of putting soft india-rubber tube, three-quarters of an inch thick, on each handle a most useful means of saving vibration through the arms and chest. The saddle that is easiest seems to me to be one resting on three spiral springs.

CHAPTER XIV.

SOME ADDITIONAL NOTES ON THE TRICYCLE.

THOSE who wish to be provided with more refined necessities may carry with advantage, in their tool-bag, a small case of instruments and appliances to be used in case of accident. Messrs. Krohne and Seseman have recently made such a case for general use, and it answers very well. The case, formed of strong leather and of small size, contains a pair of scissors; a knife or scalpel; a pair of forceps; a caustic-holder, to be used in case of dog bite or poisoned wound; a needle and thread, an Esmarch's bandage with figures printed upon it to indicate modes of application; a small bristle loop for removing particles which may have accidentally got into the eye; some styptic cotton, for stopping bleeding from a surface wound; a compress, for fixing on a wound which is deep and is bleeding from an injured vessel; and a packet of

plaster. There is here in little compass a *multum in parvo* of useful appliances which any intelligent person may, in emergency, use with good effect.

Returning for a moment to the tricycle itself, there are two matters on which I would dwell before I close this chapter. One relates to the question of pedalling, the other to the question of what is called "gearing" the machine.

I have spoken so far of machines which are propelled by the rotary motion of the pedals; but there are others in which the motion is carried out by a long lever, that is, by a motion which as nearly as possible resembles actual stepping or walking. If this plan could be made quite perfect, and if the machine fitted with it could be brought down to as light a weight as the lighter rotary machines, and if, again, it could be so constructed as to allow of back pedalling, then an advance of no mean quality would be secured. As yet, however, the means have not been so complete as could be wished. I used one of the best of the lever tricycles for a while, and in many respects I liked it exceedingly, but in the end I gave it up for the rotary form, and with unquestionable advantage. I still expect, nevertheless, to see a further improvement in the lever tricycle.

As to gearing. By gearing is meant the adaptation of the mechanism so as to give the rider

more or less power in propulsion. If the driving wheel of the machine be geared level, each complete turn of the pedals will represent one rotation of the driving wheels. If the machine be geared up, one complete turn of the pedals will give more than one revolution of the driving wheels, but the work will be harder. If the machine be geared down, one complete turn of the pedals will not cause one complete revolution of the driving wheels, but the work will be easier. On level roads it is almost as easy to propel with a machine moderately geared up as with one geared level or geared down. In descending a hill, it does not matter whether there be gearing up, gearing down, or level gearing. In climbing it is easiest to work a machine which is geared down.

We have to decide which on the whole is the best. For my part, I like a machine geared a little up. A wheel of forty-eight inches diameter, geared up to fifty-four, seems to me the right thing. Next to that I should give the preference to a machine that is geared level.

I argue in this way from practice. I prefer a slow and powerful stroke to a quick and less powerful one. The slow work tires me less quickly. In climbing hills, if they are very steep, I prefer dismounting and pushing up the machine to the labour of toiling slowly up on a machine

geared down. Gearing down, therefore, is of little service to me, since, in the geared up machine, I gain on level and descending ground, while I lose practically nothing in climbing.

Machines are now made by which the gearing can be modified according to the pleasure of the rider, while the tricycle is in motion. The crypto-dynamic invention, which can be adapted to any tricycle, is a mechanism of this character, and answers well. The tricyclist, who has learned to ride the simple machine, and who feels it necessary to have assistance in climbing, can adopt this addition at pleasure.

HIGA